

Editorial

New directions in research on childhood adversity

Andrea Danese and Stephanie J. Lewis



Summary

Childhood adversities are major preventable risk factors for poor mental and physical health. Scientific advances in this area are not matched by clinical gains for affected individuals. We reflect on novel research directions that could accelerate clinical impact.

Keywords

Childhood experience; trauma; measurement; study design; prediction modelling.

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‘To know what you know and what you do not know, that is true knowledge’

Confucius, 551–479 BCE

Childhood adversities can be described as experiences that challenge basic safety and support, requiring significant adaptation by the developing child. They typically include experiences of abuse and neglect but, depending on the definition used, could also include parental mental illness, substance misuse, incarceration and separation, as well as peer bullying and more. Childhood adversities are major preventable risk factors for poor mental and physical health. Over the years, research has generated a rich set of theories to explain why children exposed to adversity are more likely to develop poor health outcomes. However, we have struggled to use these theories to produce tangible clinical gains. To move forward, we need to rethink how we measure childhood adversity, how we investigate the mechanisms through which childhood adversity affects health and how we model risk linked with childhood adversity to identify the most vulnerable individuals.

Measurement

To map the health outcomes associated with childhood adversities, understand the mechanisms underlying these associations and thus design effective interventions, it is necessary first to clarify how experiences of childhood adversities are best captured.

A long-standing debate has focused on the value of quantitative versus qualitative approaches to measurement of adversity. Historically, quantitative approaches using cumulative scores have dominated because of their simplicity. One example is, of course, the Adverse Childhood Experience (ACE) score, which has consistently been associated with poor health outcomes. However, this score does not capture differences within or between each ACE category.¹ Progressively, more sophisticated approaches have been proposed to test possible qualitative differences between types of adversity. For example, a popular approach posits a distinction between experiences of threat and deprivation. Although some data support specificity of associations based on these dimensions,

critics have highlighted that such dimensions are ‘fuzzy’ categories, often co-occur and do not capture all key characteristics of the exposure (e.g. its predictability or controllability).² Another qualitative approach familiar to clinicians proposes that the combination of early age at exposure, interpersonal violence and recurrence could identify a particularly detrimental type of adversity known as complex trauma. Although initial data again support specificity of associations with complex trauma, alternative quantitative explanations – the idea that complex traumas are at the upper end of a trauma continuum, for instance because of high severity or frequency – are possible and require further probing.³ Overall, a new generation of studies testing quantitative versus qualitative approaches head to head is needed to address this debate more directly.

An additional issue relates to the data source used to measure adversity. For practical reasons, most empirical research in this area is based on retrospective self-reports from adults that capture their first-person perspective. Although we have long assumed that these subjective measures are valid proxies for documented or prospective measures of childhood adversity (the third-person or ‘objective’ perspective), this assumption is not supported by the available data.⁴ Objective and subjective experiences of childhood adversity differ and are differentially associated with later disease risk. This was explicitly tested in a sample that collected both objective measures of childhood maltreatment through official court records and subjective measures through retrospective recall in adulthood.⁴ Even for severe cases of childhood maltreatment identified through court records, risk of psychopathology linked to these objective measures was minimal in the absence of subjective reports.⁴ In contrast, risk of psychopathology linked to subjective reports of childhood maltreatment was high, whether or not these reports were consistent with objective measures.⁴ New research is therefore needed to better understand the subjective experience of childhood adversity and its association with poor health.

Mechanisms

To inform the development of effective interventions, it is essential to understand the mechanisms through which childhood adversity affects mental and physical health.

A dominant explanatory theory posits that, because of the effect of toxic stress mediators or deprivation of necessary input, childhood adversity could result in damage to the brain and affect cognitive abilities. This theory is well supported by experimental animal models. In these studies, because of experimental manipulation, pre-existing characteristics do not affect allocation to adverse rearing environments, ruling out their potential confounding effects. But how relevant are

these models to the experiences of children? How valid is the immediate translation of findings from animal research to humans?

In humans, evidence from observational studies showing that childhood adversity is associated with cognitive deficits is often interpreted as support for this theory. However, unlike in animal experiments, exposure to childhood adversity is not randomly distributed in humans, and pre-existing characteristics may affect the likelihood of experiencing adverse environments. This important difference between animal and human studies calls for additional caution in inferring causation from observational human studies. On the one hand, it is possible that children who have adverse experiences such as maltreatment, bullying or other traumas have the same pre-existing cognitive abilities as peers who do not have such experiences. In this case, any differences in cognitive abilities after adversity could potentially be attributable to the adversity. On the other hand, children who have adverse experiences could have pre-existing cognitive deficits that predispose them to adversity (e.g. by making them more difficult to parent or more vulnerable to exploitation) and remain after adversity in the absence of any causal effects of these early experiences. It is impossible to differentiate between these two scenarios in most published studies where cognitive abilities were measured only after childhood adversity. However, longitudinal prospective studies with repeated measures of cognition have shown that pre-existing abilities largely account for differences in cognitive abilities after childhood adversity, questioning conventional causal interpretations across multiple measures of adversity.³ Further research capitalising on longitudinal and genetically sensitive designs (e.g. with twins, siblings or adoptees) is needed to further test dominant explanatory theories for the effects of childhood adversity on health.

Modelling

The promise of interventions can only be fulfilled if we are able to accurately identify children and adults who are at greatest risk of developing poor health outcomes and should therefore be offered targeted support.



Risk stratification is currently based on screening for childhood adversity – most commonly through reports on ACEs. However, this screening is unhelpful to buffer the risk of poor health outcomes. The implementation of ACE screening is based on the epidemiological findings that groups of individuals with higher ACE scores have, on average, a greater risk of mental and physical health problems than groups of individuals with lower ACE scores. Yet, within each ACE group there is great individual variability: not all individuals in the highest risk group (i.e. $\geq 4+$ ACEs) have health problems, and many individuals with fewer or no ACEs do have health problems. Individual differences – for example emerging from a child's, family's and neighbourhood's characteristics or because of co-occurring positive experiences – dilute the accuracy of predictions based on ACE screening.¹ As a result, individuals who have high ACE scores but will not develop disease (termed false positives) would be offered inappropriate or unnecessary costly interventions such as clinical testing, imaging and referral for psychiatric assessment, whereas others who do not have high ACE scores but will develop disease (or false negatives) could miss out on effective interventions. How can we then improve the accuracy of our predictions?

Decades of research on resilience offer valuable *a priori* hypotheses on the determinants of individual differences in response to childhood adversity. However, as in the case of ACEs, we cannot assume that factors that explain risk and resilience in the population could swiftly be used to provide accurate individual prediction. Instead, future research will need to empirically test multivariate risk and resilience models in longitudinal studies addressing

distinctive methodological challenges.⁵ Models will need to be developed in large enough samples to minimise idiosyncrasies specific to a given data-set (overfitting); they will need to be validated in unused cases from the original development data-set (internal validation) and, ideally, in new data-sets (external validation) to ensure generalisability to other samples; and their prediction performances will need to be directly tested (e.g. discrimination and calibration).

Conclusions

Recent research has highlighted many unknowns about measurement, mechanisms and modelling of childhood adversity, pointing to novel research directions. The challenges brought by the necessary perspective shift in concepts, designs and analytical techniques are considerable, but match the ambition to produce tangible clinical gains in the lives of many of the most vulnerable members of our society.

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Data availability

Data availability is not applicable to this article as no new data were created or analysed in its preparation.

Author contributions

A.D. wrote the first draft of the manuscript. S.J.L. provided critical feedback. Both authors approved the final version of the manuscript.

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Declaration of interest

None.

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